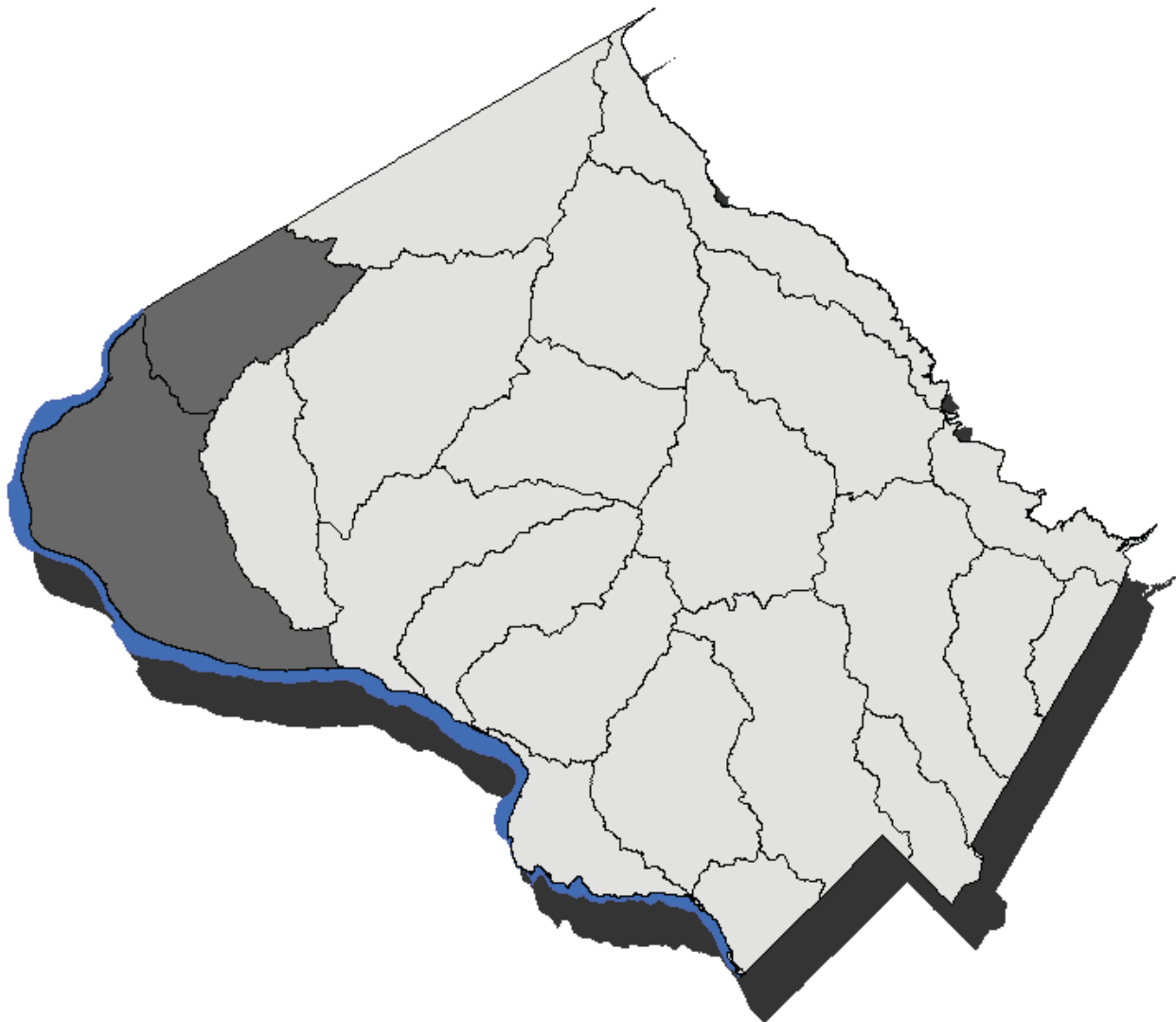




UPPER POTOMAC DIRECT Pre-Assessment Report

PREPARED FOR:
MONTGOMERY COUNTY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
255 Rockville Pike, Suite 120



May 2011

PRE-ASSESSMENT REPORT

Upper Potomac Direct Watershed

May 2011

Prepared for:

Montgomery County Department of Environmental Protection

255 Rockville Pike, Suite 120

Rockville, MD 20850

Prepared by:

Versar

9200 Rumsey Rd

Columbia, MD 21045-1934

In collaboration with:

Biohabitats, Inc.

2081 Clipper Park Road

Baltimore, MD 21211

Horsley Witten Group

90 Route 6A

Sandwich, MA 02563

Capuco Consulting Services

914 Bay Ridge Road, Suite 206

Annapolis, MD 21403

Chesapeake Stormwater Network

117 Ingleside Avenue

Baltimore, MD 21228

RESOLVE

1255 23rd Street, NW, Suite 875

Washington, DC, 20037

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1. INTRODUCTION

To successfully meet its regulatory requirements and environmental goals, Montgomery County (MC) must complete and revise watershed restoration plans on a continuing and regular basis. No watershed restoration plan has yet been completed for the Upper Potomac Direct and its component subwatersheds, Little Monocacy and Broad Run. See Figure 1-1. Therefore, the county has undertaken preparation of this “Pre-Assessment” as the first step toward completing a watershed restoration and implementation plan that will, ultimately, address changing watershed conditions, apply new restoration technologies, and refine implementation strategies, as needed to achieve watershed restoration success. The *Recommended Framework for Watershed Restoration Plans* describes this process in detail and provides background information on how the pre-assessments are being developed and will evolve into watershed restoration and implementation plans.

1.1 REGULATORY AND PROGRAMMATIC CONTEXT

The Upper Potomac Direct watershed in Montgomery County drains to the Potomac River Montgomery County assessment unit (MD-02140202). Based on the 2008 Integrated Report (combined 303(d) List and 305(b) Report), this part of the Potomac River basin is biologically impaired as of 2006 (combination of benthic and fish bioassessments), impaired for Total Suspended Solids (TSS) as of 1996, impaired for total phosphorus (TP) as of 1996 and impaired for PCBs in fish tissue as of 2008 (MDE2008, MDE 2009). In addition, the Potomac River basin is subject to the Total Maximum Daily Loads (TMDLs) for nutrients and sediment to assure Chesapeake Bay water quality restoration.

The goals for each watershed restoration plan must reflect MS4 Permit requirements and should incorporate the following key watershed restoration goals from the updated Countywide Stream Protection Strategy developed by the Montgomery County Department of Environmental Protection (MCDEP, 2003):

- Restore county streams damaged by inadequate management practices in the past, by re-establishing the flow regime, chemistry, physical conditions, and biological diversity of natural stream systems as closely as possible
- Explore opportunities to lessen unintended, adverse environmental impacts of land development on water resources
- Reduce nonpoint runoff sources and air deposition sources of nitrogen impacting local streams and the Chesapeake Bay
- Target and reduce general runoff pollution loadings from runoff draining intensively developed urban/suburban areas, while also providing other important cross-media environmental benefits.

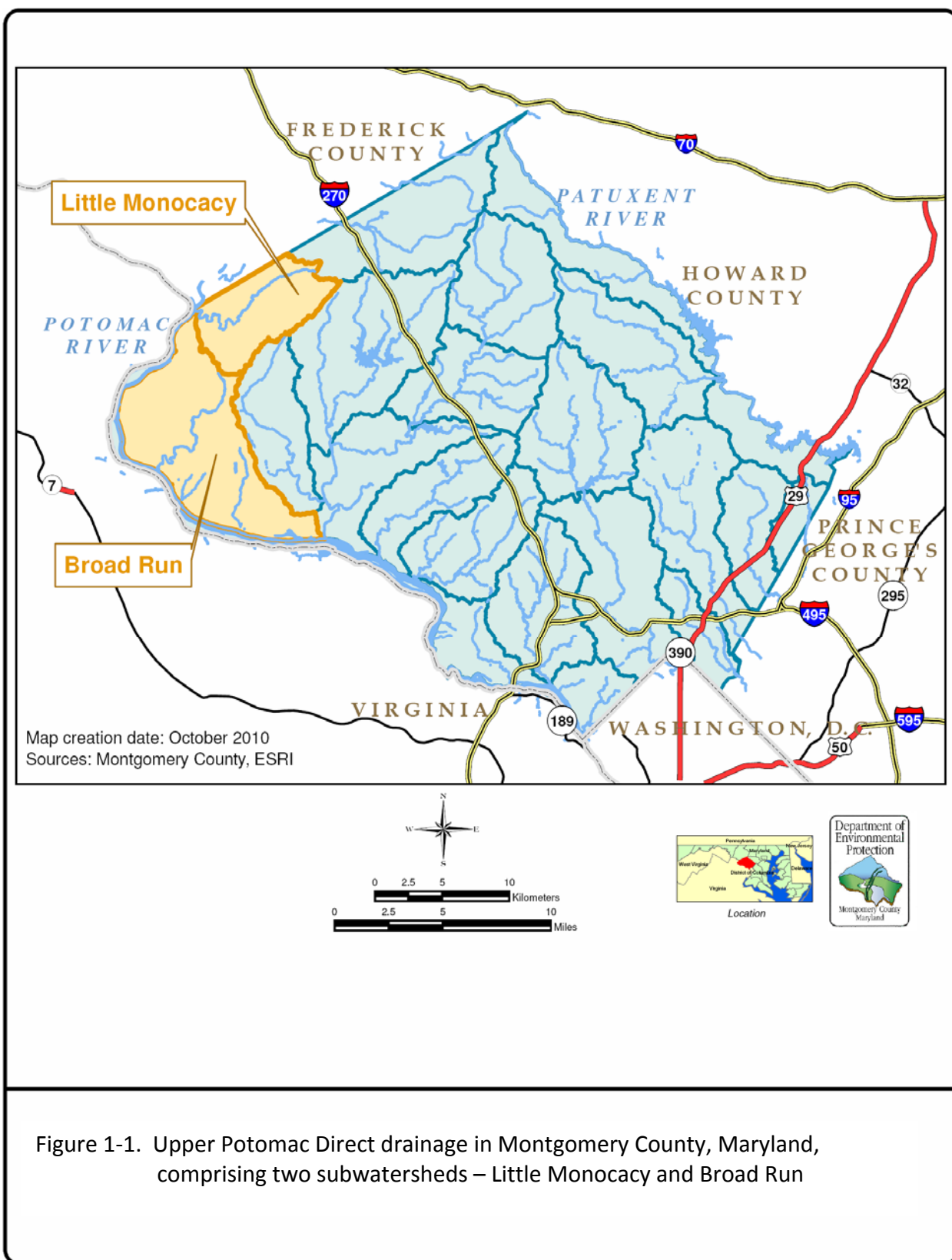
- Promote and support new outreach initiatives that enhance public awareness and increase citizen participation in environmental stewardship
- Develop and implement a comprehensive approach for assessing environmental quality that integrates information on terrestrial, wetland and stream conditions
- Continue producing an enhanced, accurate, understandable, watershed-based assessment of county stream conditions
- Reduce trash loads in accordance with the targets set forth in the Potomac Trash Treaty.

1.2 GOALS OF THE PRE-ASSESSMENT

The specific goals of the pre-assessment for the Upper Potomac Direct are

- Summarize the current environmental conditions of the watershed including known sources of impairment such as 303(d) listed waterbodies and 305(b) reports and indexes of biological integrity
- Describe the current land uses of the watershed, particularly imperviousness and its distribution across land uses, as well as forest cover, especially as it relates to stream buffer
- Describe existing stormwater management practices
- Conduct a neighborhood-scale desktop analysis of BMP retrofit opportunities using priorities previously agreed upon by MCDEP.

Once the Pre-Assessment is completed for Upper Potomac Direct, a full watershed implementation plan will be undertaken. The approach will be to expand on the pre-assessments by updating any environmental condition information and conducting field investigations to identify specific watershed restoration sites. Following the field investigations, concept plans would be developed for candidate restoration sites to serve as the action inventory. Pollutant loading estimates and public involvement would also be conducted to assign priorities and integrate the watershed assessment into the Countywide Coordinated Implementation Strategy.



2. ENVIRONMENTAL CONDITIONS

2.1 THE SUBWATERSHEDS OF THE UPPER POTOMAC DIRECT

The Upper Potomac Direct is located in rural western Montgomery County, and includes the subwatersheds of Little Monocacy and Broad Run. Figure 2-1 delineates all of the Upper Potomac Direct which includes the Little Monocacy and Broad Run subwatersheds. The Little Monocacy and Broad Run subwatersheds drain directly into the Potomac River. The border between the two subwatersheds is roughly demarcated by Route 28 beginning in Beallsville.

Due to the generally well-drained underlying Triassic sandstone, the upland streams here tend to experience low baseflow during the summer months. The combined drainage area of these subwatersheds that lies within Montgomery County is approximately 60 square miles.

2.1.1 Little Monocacy River

The Little Monocacy River lies in the extreme northwestern region of the county and passes through the cities of Comus and Dickerson en route to the Potomac River. The Little Monocacy headwaters are located southwest of the town of Comus. The stream flows southwest approximately nine miles through predominately agricultural areas and enters the Potomac River just downstream from the mouth of the Monocacy River.

Many of the headwater streams are well forested and there is very little imperviousness within the subwatershed. The lower section of the river is a wide, rapidly flowing body of water. Deep pools and an abundance of riffles support a diverse cool water fish community. It is one of the most scenic rural watersheds in the county (CSPS, 1998). It supports habitat and water quality parameters supporting good stream conditions throughout the watershed. The headwaters, which drain a portion of Sugarloaf Mountain, support excellent stream conditions. (CSPS 2003)

2.1.2 Broad Run

The headwaters of Broad Run begin west of the Town of Poolesville, near the intersection of Wasche Road and West Hunter Road and pass through a section of Montgomery County little changed in over one hundred years before discharging into the Potomac River (CSPS 2003). The stream flows south through rolling hills for approximately eight miles before entering the Potomac River. Land use has been historically agricultural in this area, and many small farms still actively cultivate crops or maintain livestock. A forested stream buffer provides protection along many stretches of Broad Run. The watershed has been designated part of the County's Agricultural Preserve, so land uses are not expected to change significantly.

Horsepen Branch, which is a major tributary in the Broad Run subwatershed, begins in an upland area south of the Town of Poolesville, near the intersection of Westerly Road and West

Willard Road. The stream flows south, with one branch flowing through a large impoundment located on the Poolesville Public Golf Course. Further downstream, there is an abrupt transition in geology from the sandstone-based upland areas to the alluvial sediments of the Potomac River floodplain. The stream enters the McKee-Besher Wildlife Management Area, where manmade impoundments provide important wetland habitat for many kinds of wildlife. Due to the high botanical diversity and value to wildlife, these areas have been designated wetland areas of state concern. The reach in the lower portion of the subwatershed is subject to backwater from the Potomac River during flooding, resulting in sedimentation and bank erosion problems. The stream temperature regimes in the lower section may also be influenced by the Potomac River, or by the two large impoundments in the watershed.

Horsepen Branch contains the drainage areas south of Dry Seneca Creek and enters the Potomac River within the McKee-Beshers Wildlife Management Area (MCDEP 1998). Wetlands in the lower Horsepen Branch have been designated as wetlands of special state concern because of their botanical diversity and value to wildlife (MCDEP 1998). Much of the watershed tends to dry up almost completely in the summer due to the drought-sensitive underlying geology and only supports a poor or fair stream condition. However, the upper portions support good stream conditions (MCDEP 2003).

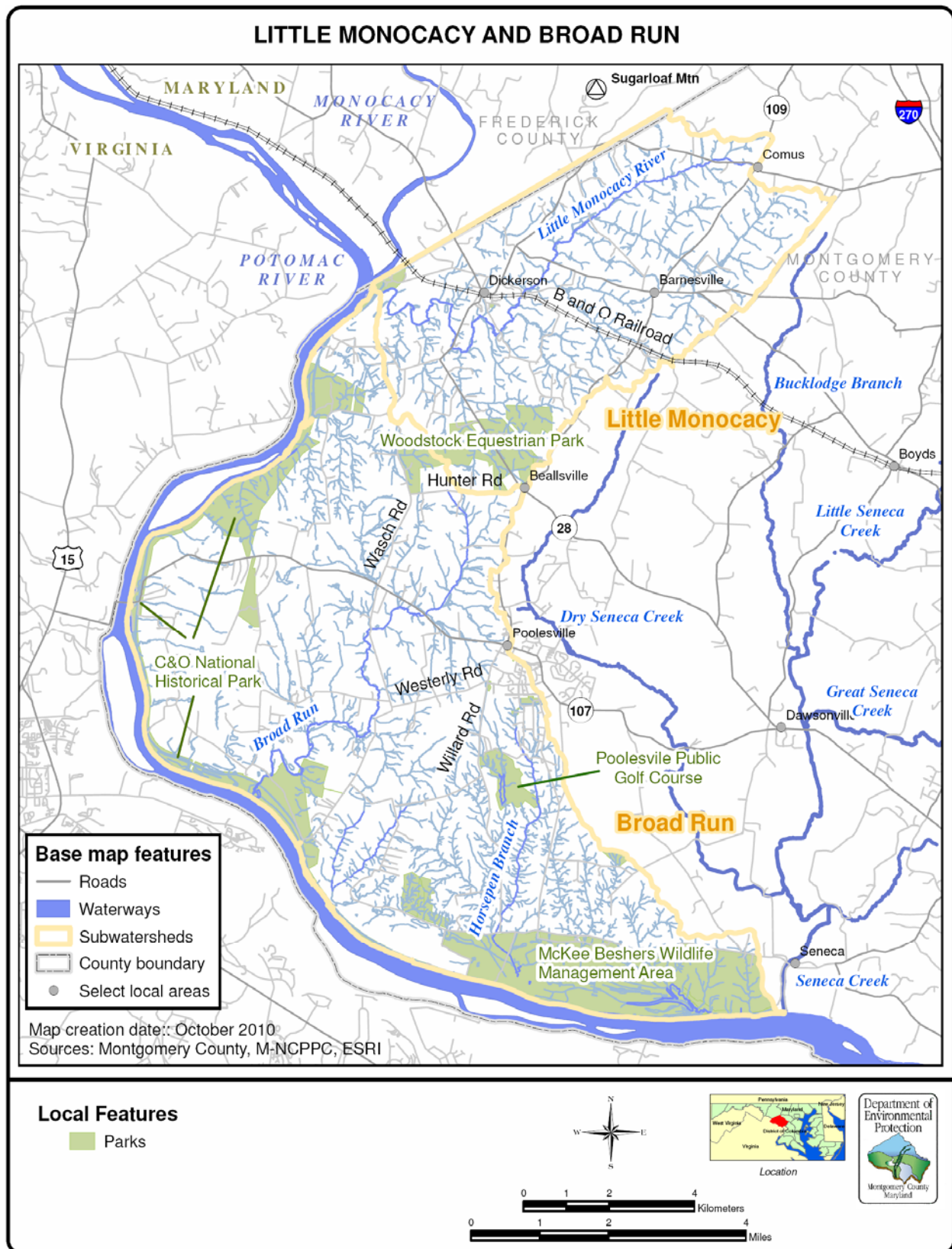


Figure 2-1. Little Monocacy and Broad Run subwatersheds in Montgomery County, Maryland

2.2 LAND USE CHARACTERISTICS

Land use groups within the Little Monocacy and Broad Run subwatersheds are shown in Figure 2-2 and Table 2-1. Neither watershed has any high density residential land use.

The Little Monocacy subwatershed, which covers 12,291 acres, is dominated by agricultural operations (54.8%) followed by forest, open space and institutional property which cover 37.6% of the watershed. Low density residential land use is the next most common land use group at 4% of the drainage area.

The Broad Run subwatershed, which includes some of the municipality of Poolesville, is more than two times larger than the Little Monocacy, at 27,435.7 acres. As in the Little Monocacy, land use is dominated by agricultural operations which comprise exactly half of the subwatershed acreage. Almost all of the remainder, at 44.7%, is comprised of the land use grouping of open urban land, forest, and institutional property. Low density residential is the next most common land use at 2.1% of the drainage area.

Table 2-1. Land use in Little Monocacy and Broad Run subwatersheds, Montgomery County, Maryland				
Land Use Group	Little Monocacy		Broad Run	
	Acres	Percent of Total	Acres	Percent of Total
Agricultural operations	6,734.0	54.8	13,704.5	50.0
Open Urban Land, Forest, Institutional, Water, Wetlands	4,623.9	37.6	1,2250.6	44.7
Low-density residential	487.6	4.0	585.8	2.1
Industrial	272.6	2.2	423.9	1.5
Roadways	152.6	1.2	265.1	1.0
Medium-density residential	6.2	0.1	113.1	0.4
Commercial	14.1	0.1	92.7	0.3
High-density residential	0.0	0.0	0.0	0.0
TOTAL	12,291.1	100	27,435.7	100
Data source: Maryland Department of Planning, 2002				

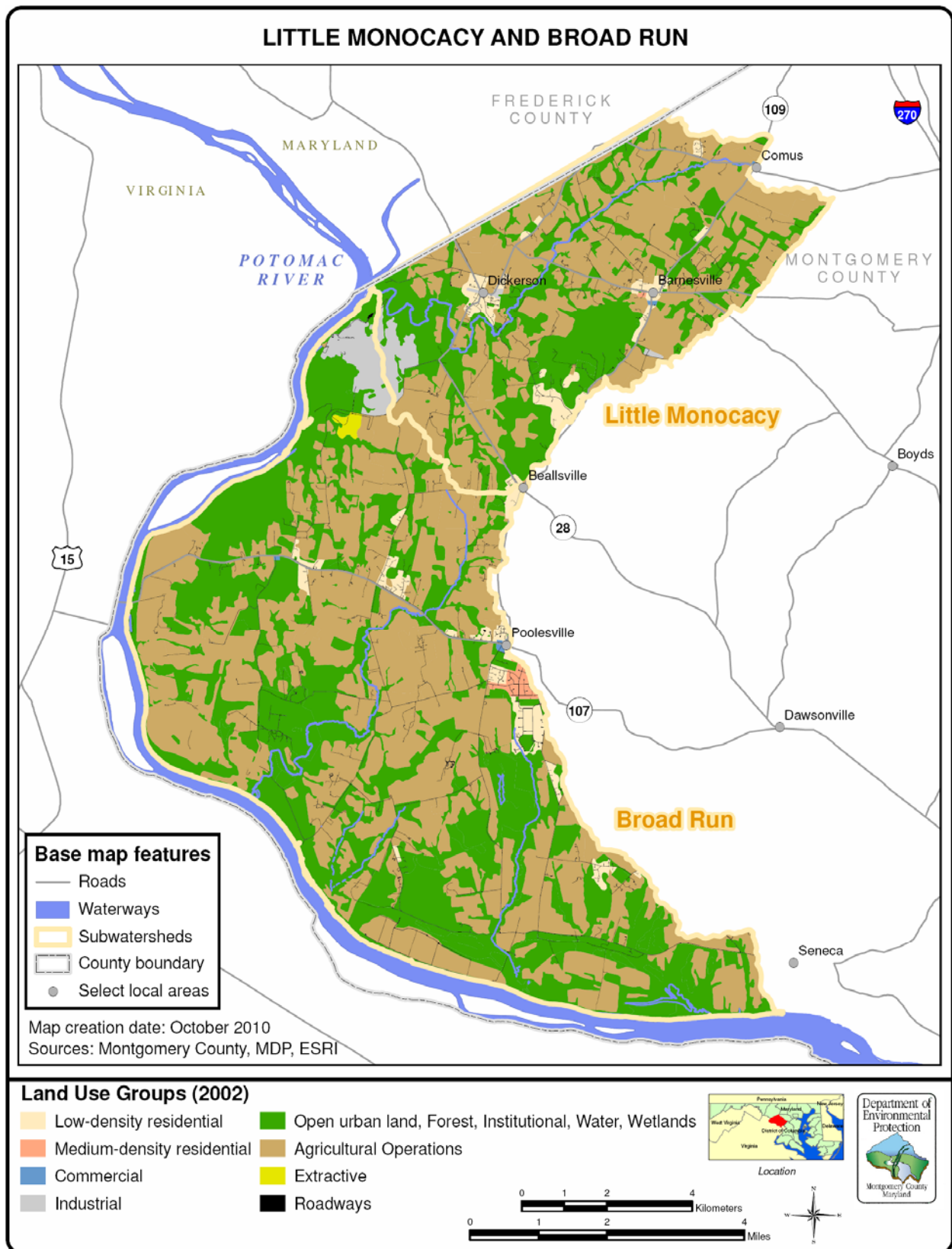


Figure 2-2. Land use in Little Monocacy and Broad Run subwatersheds in Montgomery County, Maryland

2.3 IMPERVIOUS FEATURES

Impervious land cover constituents across the two subwatersheds are illustrated in Figure 2-3 and specified in Table 2-2. The Broad Run subwatershed contains about two times the impervious cover as does Little Monocacy subwatershed. County roads and single-family residential roofs are the primary constituents of imperviousness in both subwatersheds. Figure 2-3 shows areas of contiguous imperviousness from clusters of buildings in and around Dickerson, Barnesville, and Poolesville as well as roadways within the subwatersheds.

Table 2-2. Impervious cover by type for Little Monocacy and Broad Run subwatersheds, Montgomery County, Maryland		
Major Impervious Constituents	Little Monocacy	Broad Run
Roads (acres)		
Total Roads	152.6	265.1
County jurisdiction roads	36.1	86.8
Other roads	116.6	178.3
Parking Lots (acres)		
Total Parking lots	17.3	59.0
County parcels (lots < 1 acre)	1.7	4.9
County parcels (lots > 1 acre)	1.1	12.6
Other	14.5	41.4
Roofs (acres)		
Total Roofs	52.3	112.5
County parcels	1.7	13.9
Single-family residential, detached	40.3	68.6
Schools	1.1	5.5
Other roofs, not schools	9.2	24.5
Other (acres)*		
Sidewalks	0.2	4.4
Paved Courts	1.0	2.9
Total Impervious Acres	223.6	443.8
Total Subwatershed Acres	12,411.1	27,435.8
Percent Imperviousness	1.8	1.6
* Driveways have not been included in these impervious cover calculations.		

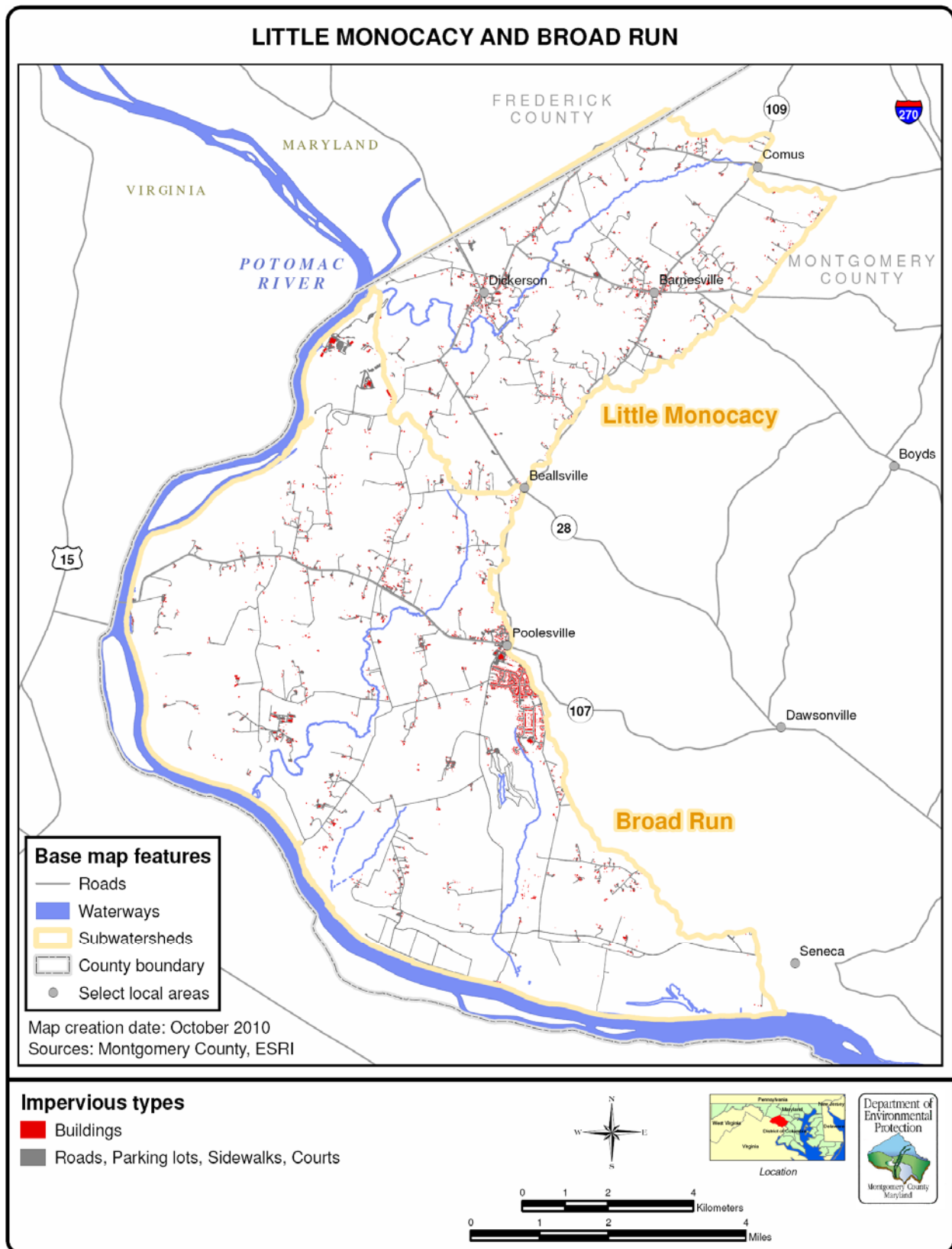


Figure 2-3. Impervious cover in Little Monocacy and Broad Run subwatersheds, Montgomery County, Maryland

2.4 HYDROLOGIC SOIL GROUPS

Figure 2-4 illustrates the extent of hydrologic soil groups found in Little Monocacy and Broad Run subwatersheds. The majority of soils in the Little Monocacy subwatershed are B and C soils. The Broad Run subwatershed consists primarily of C soils. The stream bank zone (riparian zone) tends to be dominated by Group D soils in both subwatersheds. There are no type A soils in the subwatersheds. Soils designated as A and B are able to infiltrate water more easily than soils designated as C and D.

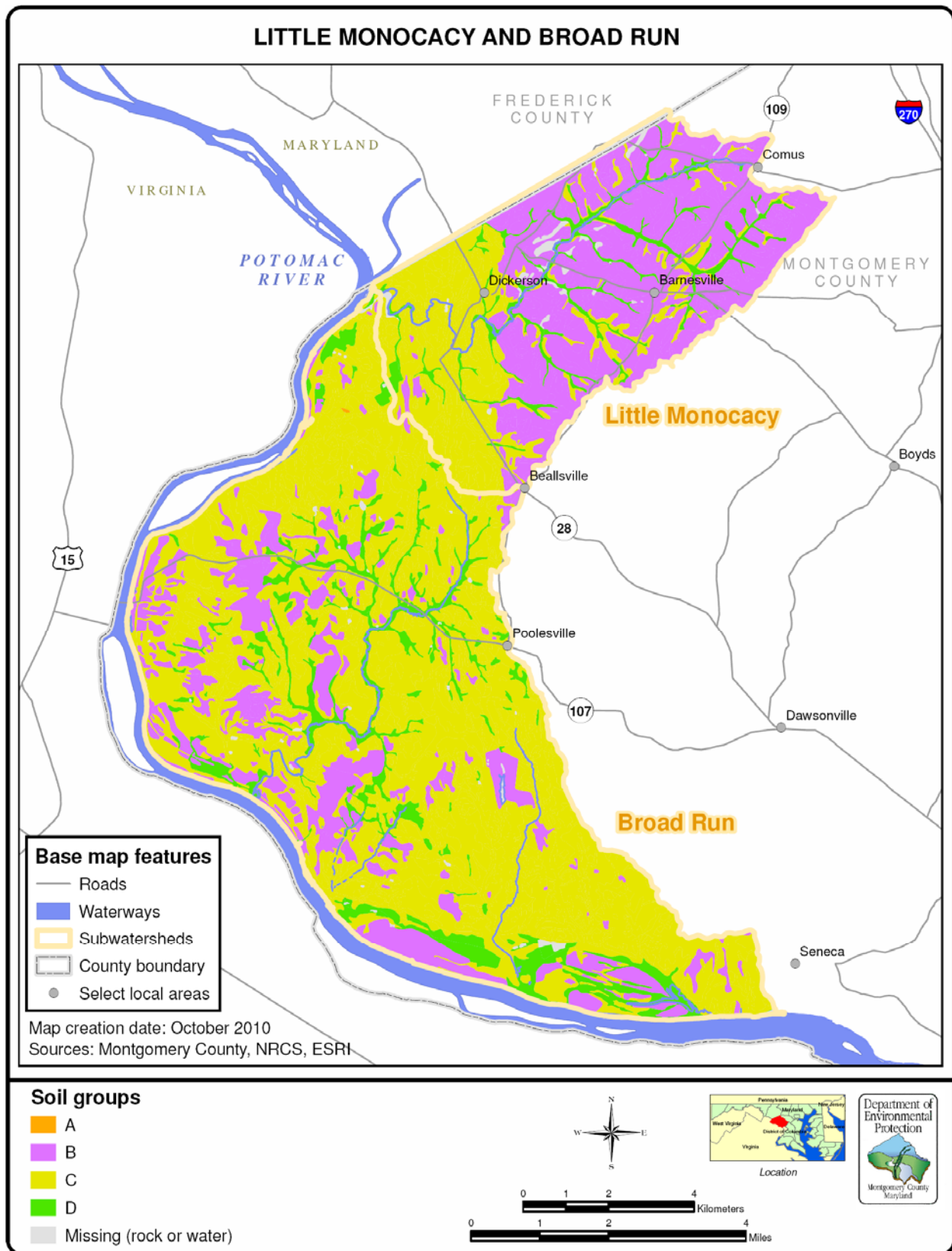


Figure 2-4. Hydrologic soil groups in Little Monocacy and Broad Run subwatersheds, Montgomery County, Maryland

2.5 FOREST COVER

Forest cover, as shown in Figure 2-5, covers more than one third of the watershed. The two subwatersheds contain 15,328 acres of forest in total; 11,207 acres or 40.8% of the total land area in Broad Run and 4,120 acres or 33.2% of total land area in the Little Monocacy.

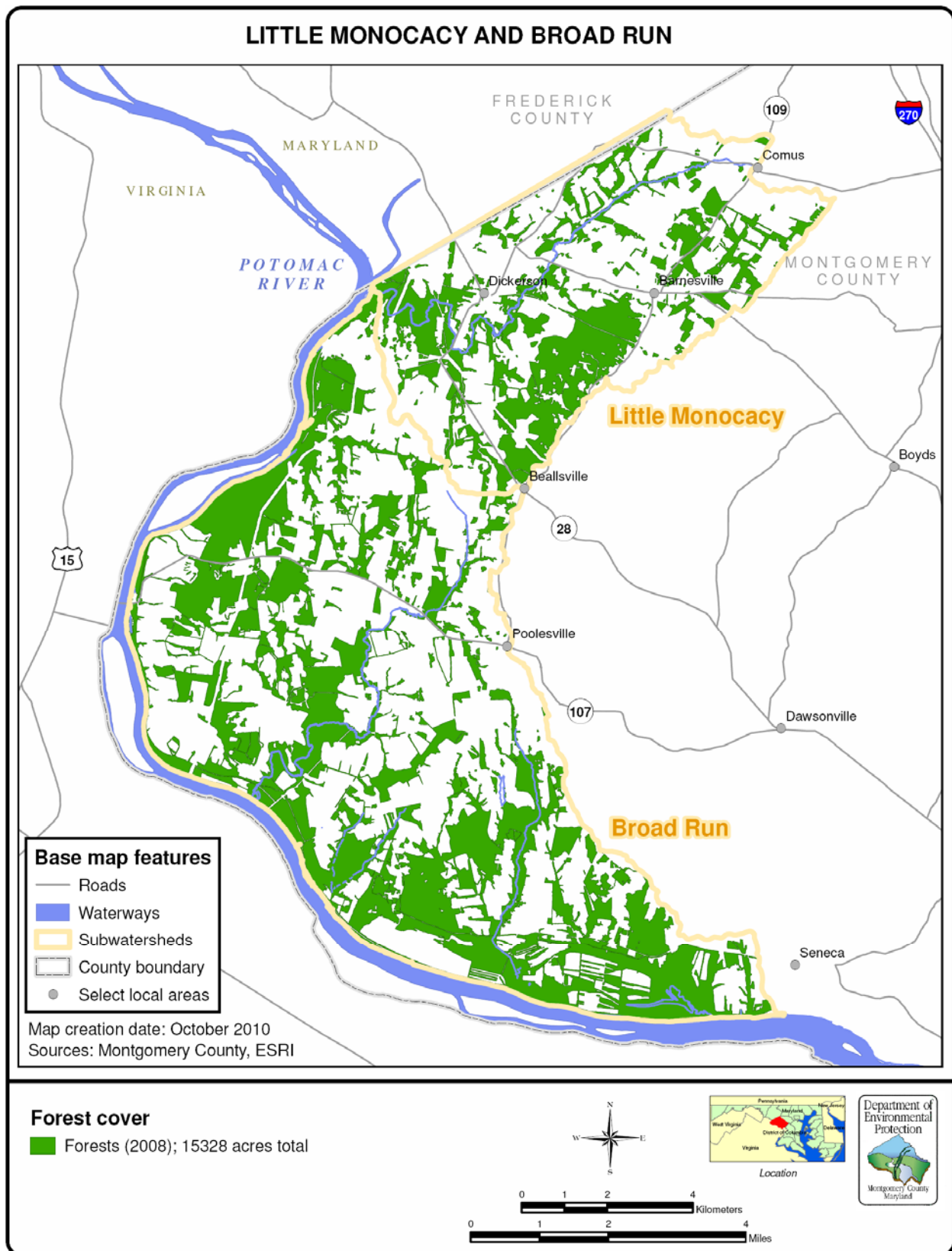


Figure 2-5. Forest cover distribution in Little Monocacy and Broad Run subwatersheds, Montgomery County, Maryland

2.6 WETLAND COVER

Wetlands, as shown in Figure 2-6, are concentrated in the southern section of the Broad Run subwatershed. Palustrine forested wetlands are relatively abundant; particularly in the southern portion of the Broad Run subwatershed, but can be found throughout the two subwatersheds and cover a total of 2,557 acres. To a significantly lesser degree, one finds unconsolidated bottom Palustrine (211 acres) and emergent Palustrine (184 acres). Some wetlands in the southeastern area of the Broad Run subwatershed have been designated as Wetlands of Special State Concern because of their botanical diversity and value to wildlife (MCDEP 1998). Wetlands of Special State Concern as shown in Figure 2-6 include one or more of the wetland types, e.g. palustrine forested.

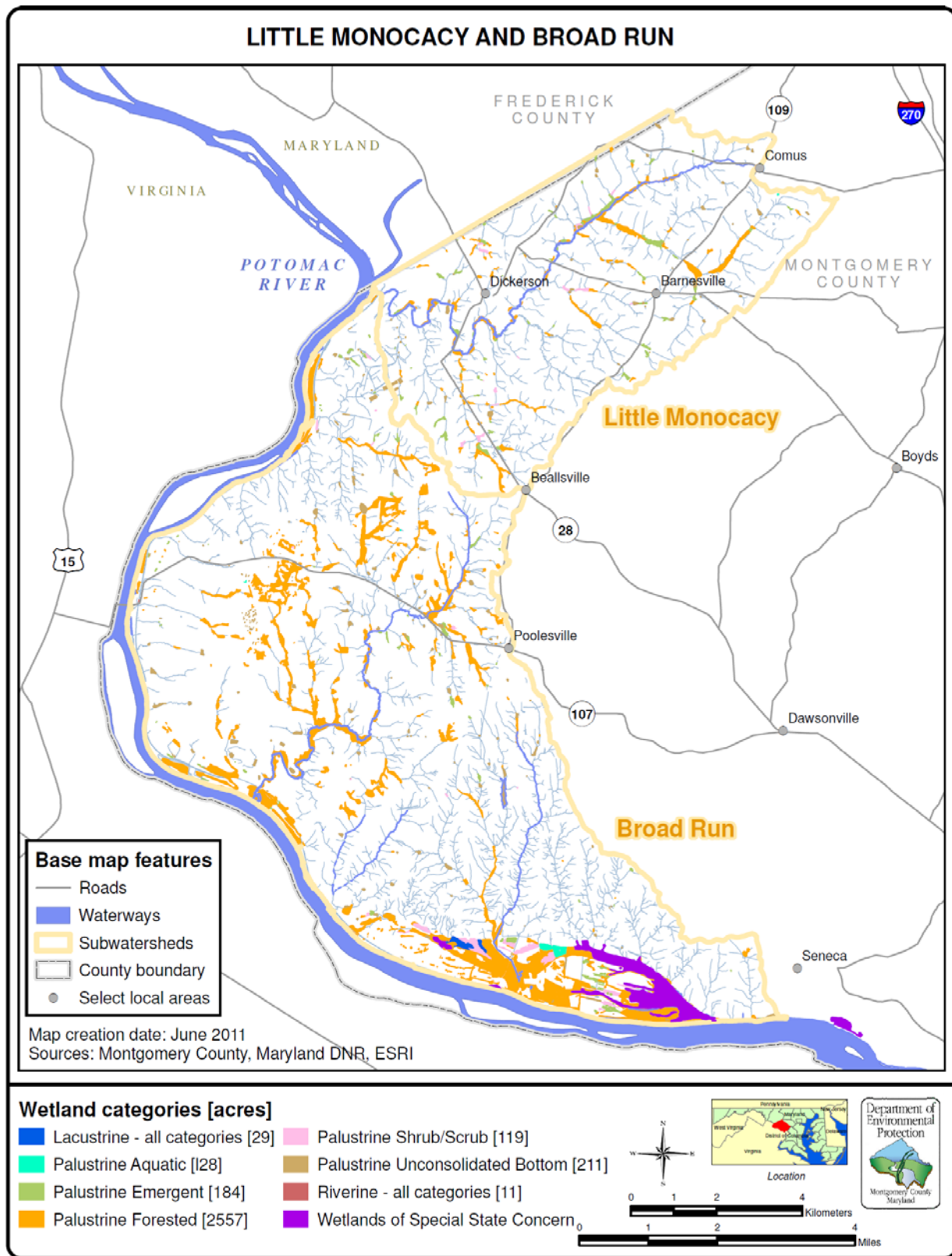


Figure 2-6. Wetland types and extent in Little Monocacy and Broad Run subwatersheds, Montgomery County, Maryland. Wetlands of Special State Concern include one or more of the wetland types.

2.7 BIOLOGICAL INDICATORS OF WATERSHED CONDITION

Figure 2-7 shows the stream condition rating categories extrapolated to the catchment of each biological monitoring sampling point. Figures 2-8 and 2-9 show the benthic invertebrate condition rating based on benthic Index of Biotic Integrity (BIBI) and Fish condition rating based on fish Index of Biotic Integrity (FIBI) scores, respectively, at sampling sites in the subwatersheds.

Most monitored sites showed excellent, good or fair stream resource conditions, with only one site in Broad Run showing a poor rating. BIBI scores are mostly good and with one poor rating in Broad Run. Not as many sampling sites were rated for fish (FIBI), but those that were showed good and excellent scores and with some fair scores along the mainstem of Broad Run.

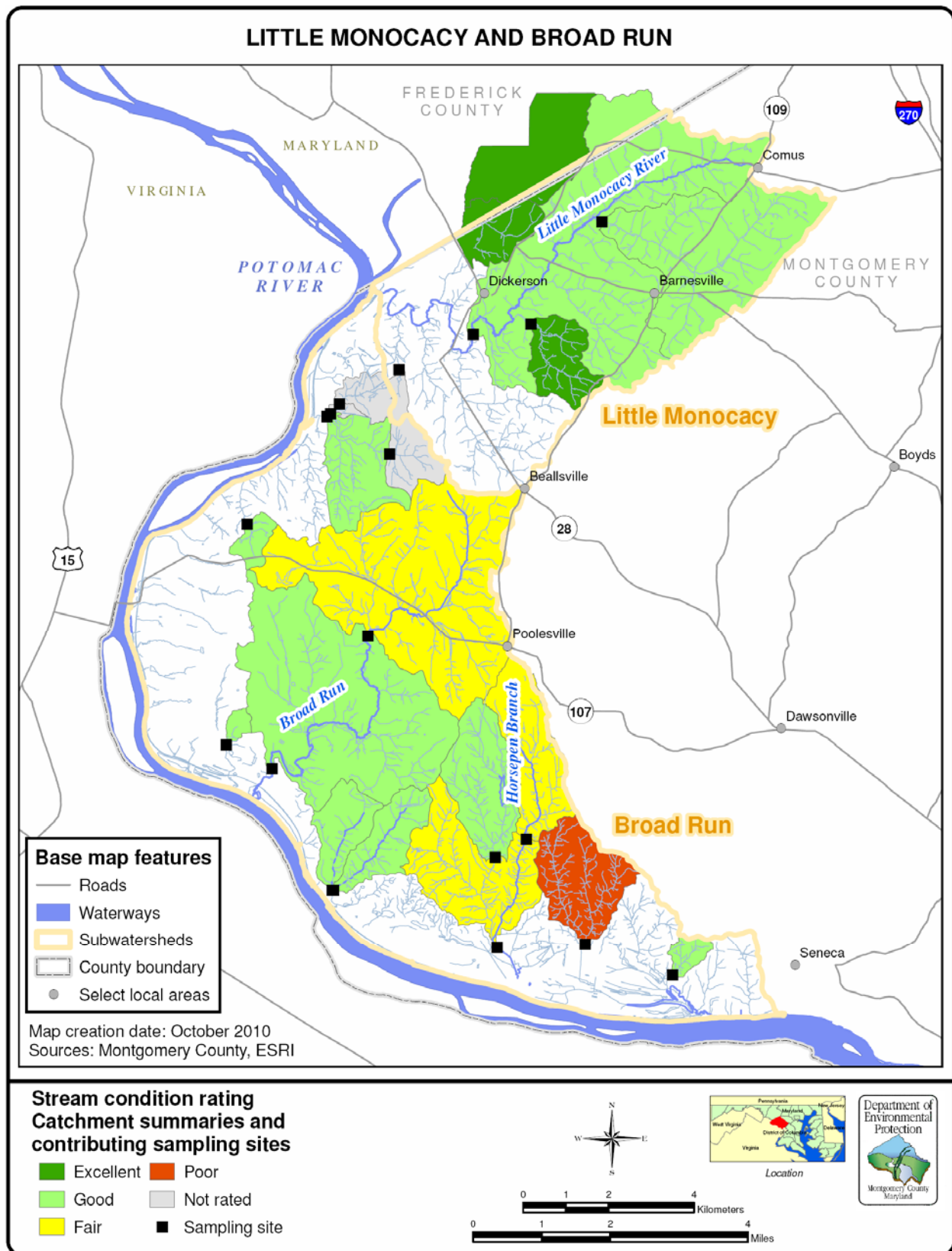


Figure 2-7. Stream condition ratings in Little Monocacy and Broad Run subwatersheds, Montgomery County, Maryland

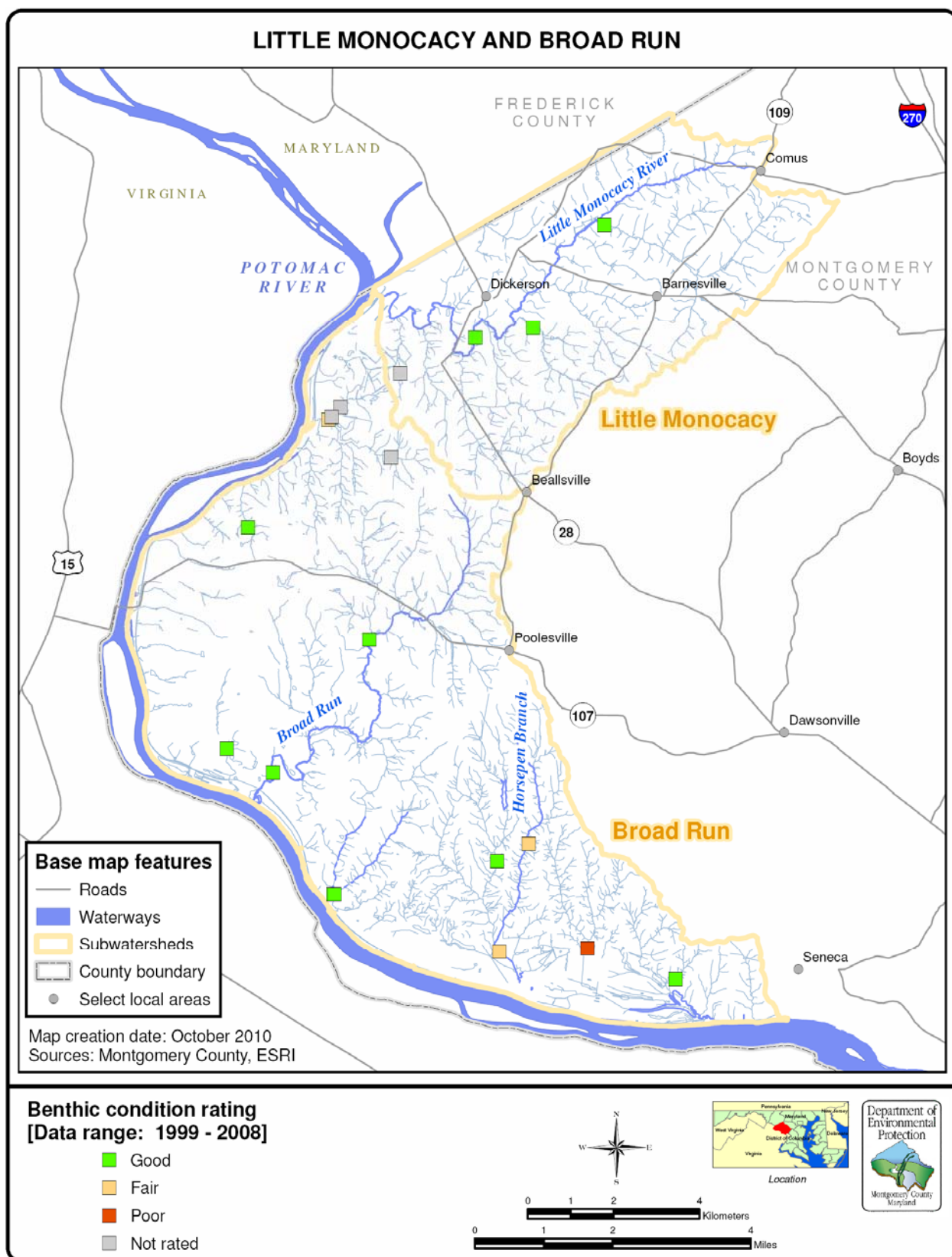


Figure 2-8. Benthic invertebrate condition ratings (BIBI) at nineteen sampling points in Little Monocacy and Broad Run subwatersheds, Montgomery County, Maryland

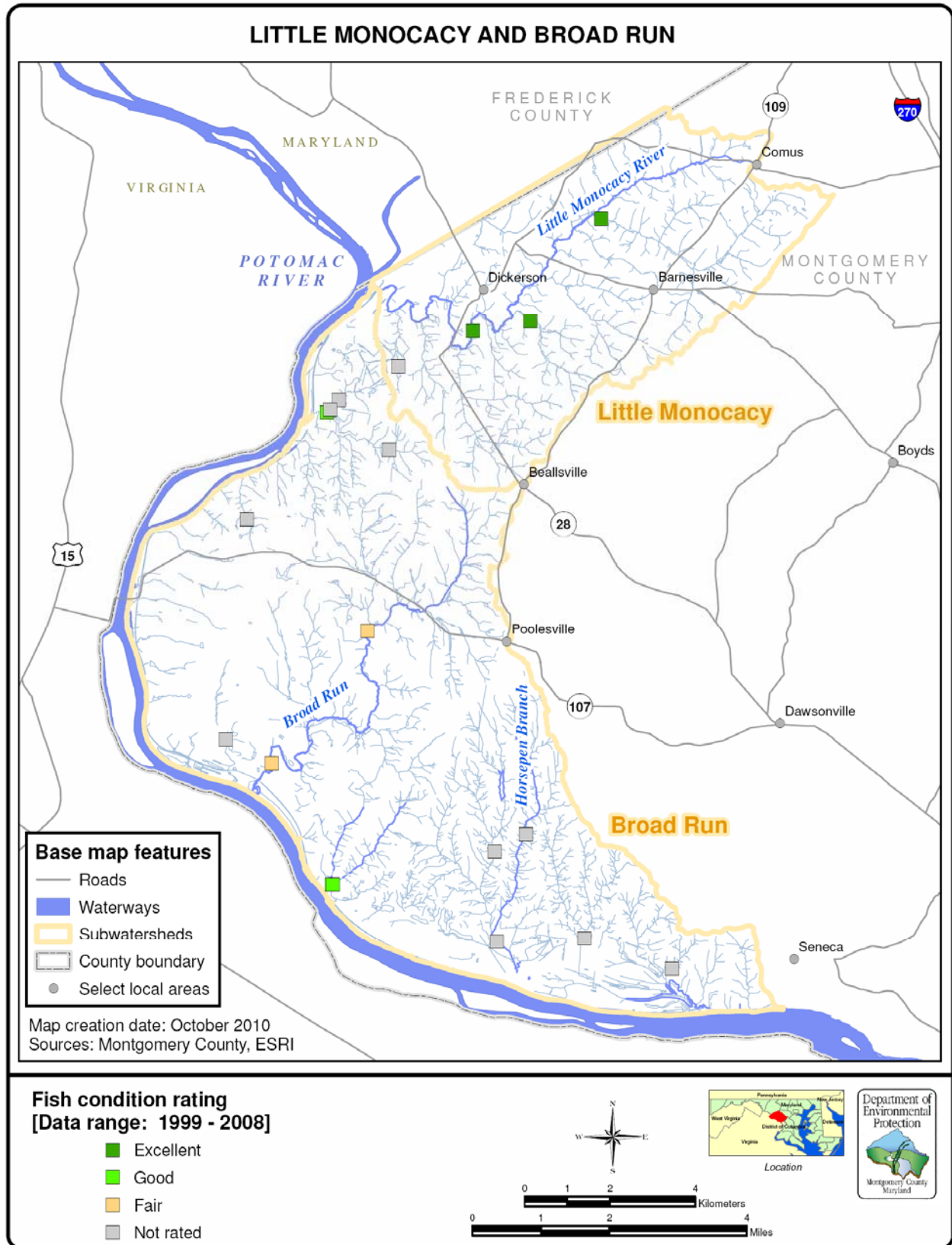


Figure 2-9. Fish condition ratings (BIBI) at nineteen sampling points in Little Monocacy and Broad Run subwatersheds, Montgomery County, Maryland

2.8 EXISTING STORMWATER BEST MANAGEMENT PRACTICES

Figure 2-10 illustrates locations of existing stormwater management devices, also called Best Management Practices, or BMPs, and the catchment area draining to or being “treated” by individual BMPs. The Guidance Document identifies three distinct “design eras,” as follows;

- Era 1: Pre-1986: BMPs installed prior to full implementation of the Maryland Stormwater law of 1984, which typically focused on detention and peak discharge reduction.
- Era 2a: 1986 to 2002. These practices reflect a design era where water quality was an important part of design, although water quality sizing and design standards were not as great.
- Era 2b: 2002 to 2009. These practices were built to the more stringent water quality and channel protection sizing requirements and BMP design standards contained in the 2000 edition of the Maryland Stormwater Manual

Currently 14 BMPs exist within the watershed; 3 were permitted before 1986 and can be considered obsolete designs and therefore candidates for upgrading. Eleven facilities were permitted after 1986. Note that drainage areas for BMPs demarcated in Figure 2-10 are often smaller than the icon indicating the location of the BMP; as such the drainage area to those facilities may not be evident in the figure. The “excluded area” is also indicated in Figure 2-10. As explained above, this area is outside of the County’s NPDES MS4 permit coverage but still within the county border. The majority of the two subwatersheds is excluded area.

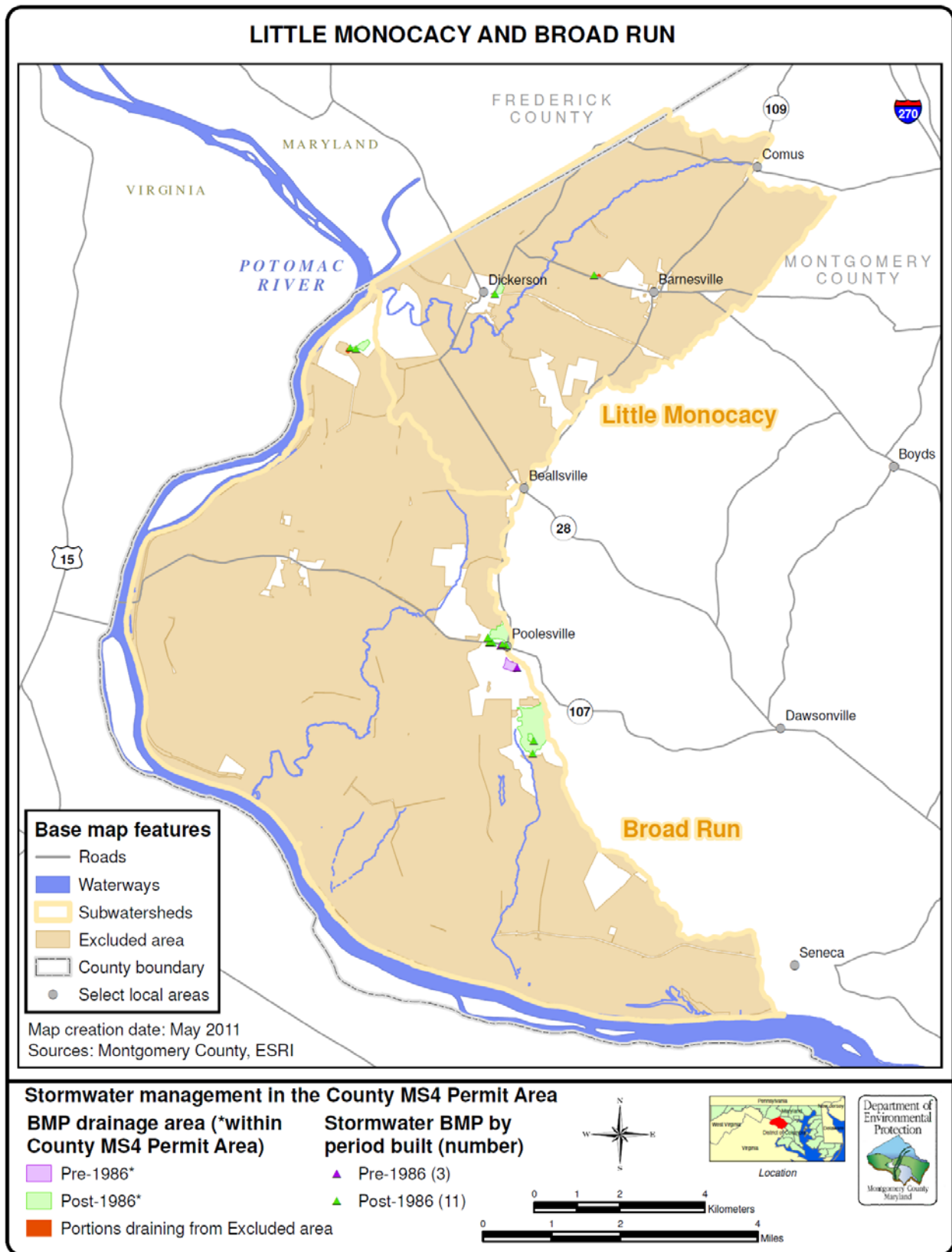


Figure 2-10. Existing stormwater management BMPs and their drainage areas in Little Monocacy and Broad Run subwatersheds, Montgomery County, Maryland

Table 2-3 shows the number of stormwater BMPs in both subwatersheds and the accounting that must be followed to meet the County's NPDES MS4 permit requirements for watershed restoration. The majority of stormwater BMPs and their drainage areas are within the MS4 boundary (14). Only two facilities that are located in the excluded area drain a portion of the County MS4 permit jurisdiction.

Table 2-3 also distinguishes between those BMPs permitted for construction before and after 1986. As mentioned above, significantly more BMPs were permitted after 1986 than before 1986 (11 versus 3) which is not surprising considering the stormwater management requirements had only been in effect for a few years prior to 1986.

Table 2-3 also indicates stormwater management facilities that lie within the excluded area, but that have drainage area both within and outside the County jurisdiction. There are two such facilities permitted after 1986 outside the County jurisdiction, with a total drainage of seven acres; 1.7 acres of which are within the County's jurisdiction.

Table 2-3. Characteristics of stormwater management (BMP) facilities permitted before and after 1986 in the Little Monocacy and Broad Run subwatersheds, Montgomery County, Maryland

Facility Permit Date	Number of facilities within County jurisdiction	Total drainage area for facilities within county jurisdiction (acres)	Total Impervious BMP Drainage area (acres)	Average drainage area per facility (acres)	Average impervious acreage treated per facility (acres)	Number of Facilities outside of County jurisdiction with part or all of drainage within county jurisdiction	Drainage area within County jurisdiction for facilities outside of county jurisdiction. (acres) ^(b)
Before 1986	3	17	2	6	0.7	0	0
After 1986	11	215	30	20	2.7	2	7
Total (all years)	14	232	32	Not Applicable	Not Applicable	2	7
(a) Includes those BMPs categorized by county as Bio-retention-type quality control as per Table B.16 General BMP Coding of Montgomery County BMP Database of the Implementation Plan Guidance Document., if applicable.							
(b) Represents facility drainage area residing within county non-excluded (MS4) area only.							

2.9 RIPARIAN FORESTED BUFFERS

Figure 2-11 indicates where the watershed's streams and rivers are protected by 100-foot forested stream buffers on each side of the stream (as measured from the centerline of the streams and from the shoreline of the rivers). Riparian forested buffers are being considered as a type of stormwater BMP for purposes of the NPDES MS4 permit accounting system. A minimum width of 100 feet on each side of the stream will be considered to provide nutrient and pollutant removal.

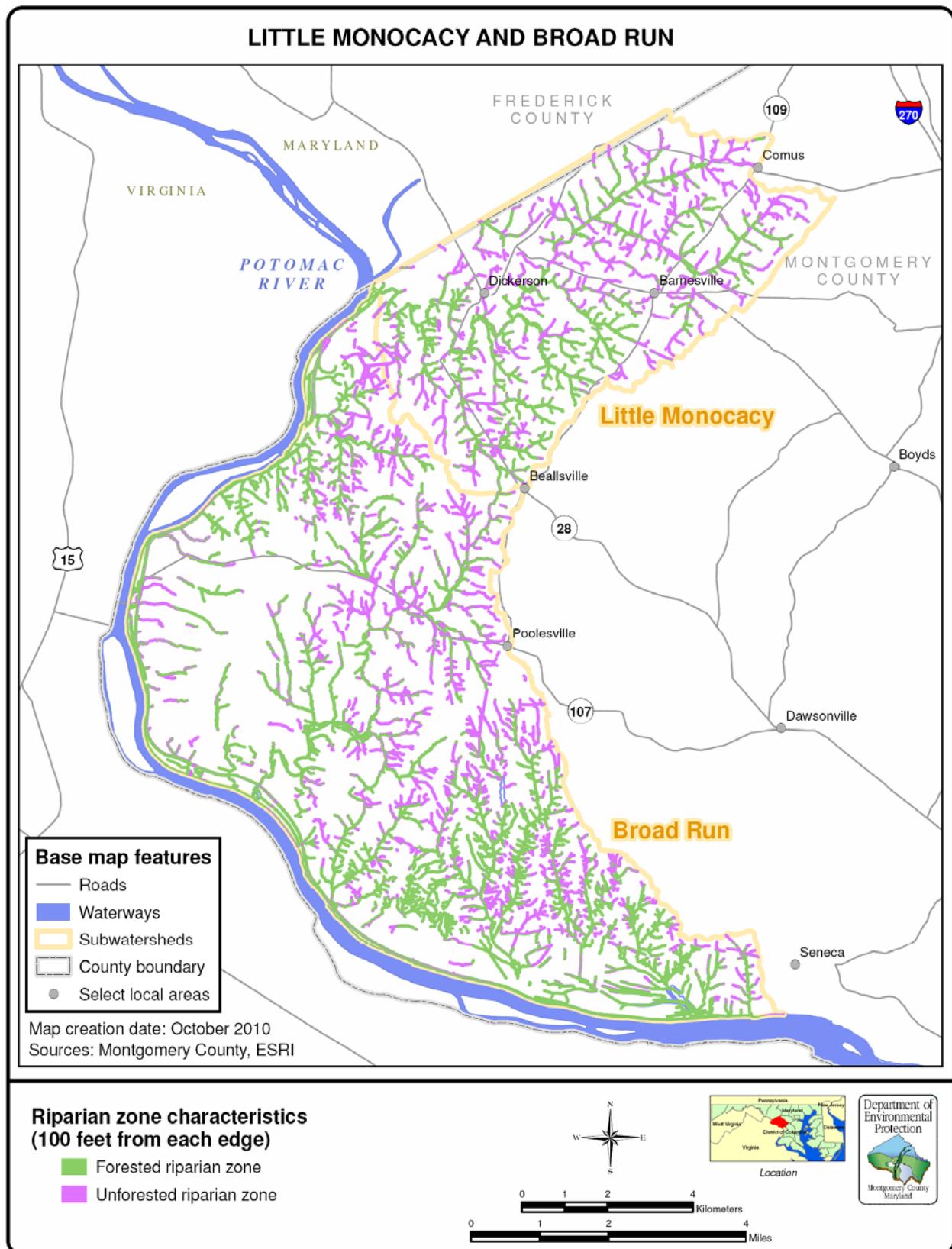


Figure 2-11. Presence or absence of forest in 100-foot riparian zone on each side of waterway in Little Monocacy and Broad Run subwatersheds, Montgomery County, Maryland

Table 2-4 summarizes presence and absence of 100-foot riparian forested buffer in both sub-watersheds. Forty-nine percent of 100-foot stream buffers in Little Monocacy and 40% in Broad Run are not forested, totaling 1,430 and 2,873 acres, respectively, in need of tree planting.

Table 2-4. Forested acres and percent forest cover along 100-foot riparian buffer in Little Monocacy and Broad Run subwatersheds, Montgomery County, Maryland.				
Riparian Condition	Acres		Percent	
	Little Monocacy	Broad Run	Little Monocacy	Broad Run
Forested	1,482	4,265	51	60
Not forested	1,430	2,873	49	40
TOTAL	2,912	7,138	100	100

3. ACTION INVENTORY

3.1 DESKTOP ANALYSIS OF BMP RETROFIT OPPORTUNITIES

In coordination with Montgomery County DEP staff, priorities have been developed for implementation of candidate retrofit stormwater management projects. Figure 3-1 illustrates the location and priority levels associated with different land use types, based on Maryland Department of Planning (2002) and neighborhood characteristics as specified in the Guidance Document. Also shown are Focus Areas identified by County staff and discussed in detail in Section 3.2.

Table 3-1 summarizes the acreage associated with each retrofit priority category and their relative contributions to the county's MS4 land area, and as a percentage of all candidate areas. The High and Medium categories have been standardized for all county watersheds but the Little Monocacy and Broad Run subwatersheds do not contain some of the land use types in the standard priority list. These are represented in the table with '0' value. The Low categories are specialized for each watershed grouping, as per County interpretation of the retrofit potential of regional elements.

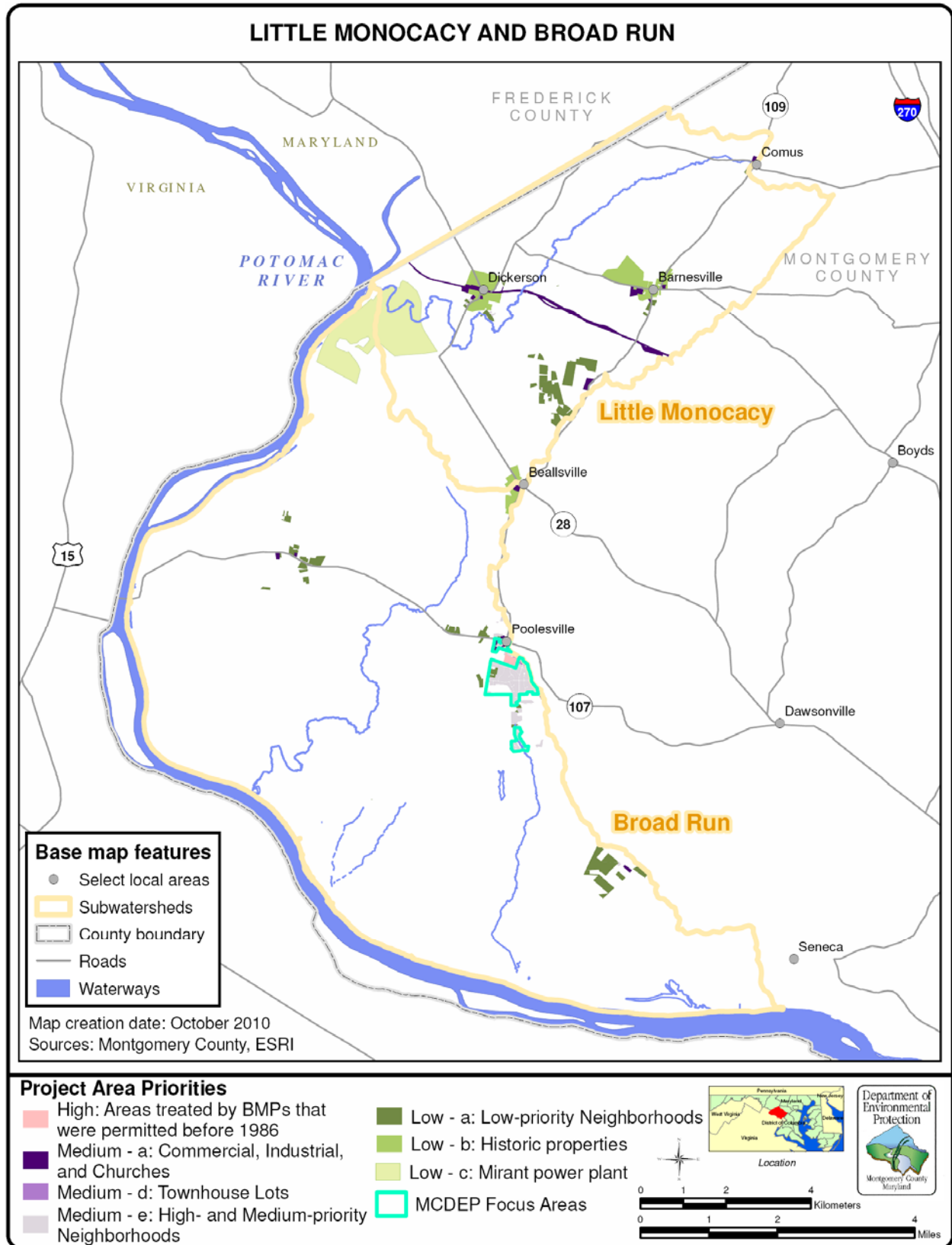


Figure 3-1. Project Area Priorities for Candidate Stormwater BMP Retrofit in Little Monocacy and Broad Run subwatersheds, Montgomery County, Maryland

Table 3-1. Stormwater BMP Retrofit Priorities in Little Monocacy and Broad Run subwatersheds						
Stormwater BMP Retrofit Priority		Candidate Acres in Subwatersheds (County MS4 jurisdiction only)			Percent in County MS4 jurisdiction in Subwatersheds	
		Little Monocacy	Broad Run	Candidate Acres by category (Percentage of all MS4 candidate acres)	Little Monocacy	Broad Run
High	Areas treated by Pre-1986 Permitted BMPs	0	17.1	17.1 (0.9%)	0.0	0.8
Land Use Type						
Medium - a	Commercial, Industrial, and Churches	121.4	32.3	153.8 (8.2%)	8.3	1.5
Medium - b	Private schools	0.0	0.0	0 (0%)	0.0	0.0
Medium - c	Apartments and Condominiums	0.0	0.0	0 (0%)	0.0	0.0
Medium - d	Townhouse lots	0.0	4.7	4.7 (<1%)	0.0	0.2
Medium - e	High and Medium Scoring Residential*	6.3	179.5	185.8 (9.9%)	0.4	8.3
Low - a	Low Scoring Residential*	186.6	188.8	375.4 (20.0%)	12.7	8.7
Low - b	Historic properties	343.7	41.1	385.1 (20.5%)	23.5	1.9
Low - c	Mirant Power Plant	423.5	334.4	757.9 (40.3)	28.9	15.5
	TOTAL	1081.5 candidate acres – or 73.9% of subwatershed County MS4 jurisdiction	798.3 candidate acres - or 37.0% of subwatershed County MS4 jurisdiction	1879.8 candidate acres of 3623.4 total acres in county MS4 jurisdiction – or 51.9%		
* Residential neighborhood assessments were designed and conducted by Biohabitats, Inc., for Montgomery County in 2010						

The priorities for stormwater management (BMP) retrofit project areas are as follows:

High Priority candidate projects in the Upper Potomac Direct are modifications of or improvements to 14 *existing BMP facilities* in the Broad Run subwatershed which were permitted *before* 1986; these BMP facilities collect stormwater from 17 acres or 0.9% of total candidate acreage for retrofit. See Table 3-1.

Medium Priority for the County is the retrofit of developed privately owned parcels which have no existing stormwater management, with prioritization by particular *land-use types and a separate neighborhood assessment ranking for residential areas*. In the Implementation Plan Guidance Document, Table B.3, Schueler, T.S, and Biohabitats, Inc. (2009) summarize findings for imperviousness for various land uses, which are cited below.

a) Commercial/Industrial/Churches

Commercial and industrial properties, and some churches, tend to have large expanses of impervious surfaces in the form of parking lots and large flat roofs; 72% imperviousness on average with only 14.8% forest and 13% turf cover. This is the highest imperviousness by land use type in the watershed with the exception of roadways. In the case of commercial / industrial / churches, 153.8 acres or 8.2% of the County MS4 land in the Upper Potomac Direct is not currently managed for stormwater.

b) Townhouse lots

This land-use type tends to average 36.8% imperviousness with 48% turf cover. This land-use type makes up only 4.7 acres or <1% of the total candidate acreage within the County's MS4, and is found in the Broad Run subwatershed.

c) High and Medium Scoring Residential Lots

The analysis for residential neighborhood priorities in Montgomery County (Biohabitats, Inc., 2010) included conditions such as lot size, ownership status, and community involvement in a homeowners association to derive a ranking system for opportunities for stormwater BMP retrofit in residential areas.

High- and Medium-scoring residential areas are relatively prominent in Broad Run, at 179.5 acres, and to a much lesser degree in Little Monocacy at 6.3 acres. Within the Upper Potomac Direct watershed, High- and Medium-scoring neighborhoods account for 9.9% of total candidate acreage in the County MS4.

Low Priority candidate projects are unique in each watershed. The priority list is headed by the Low-scoring residential neighborhood assessments, and includes regional areas that the Montgomery County DEP staff have identified as having some potential for stormwater BMP retrofit, but represent a lower priority.

a) Low Scoring Residential

The residential neighborhood analysis conducted by Biohabitats, Inc., resulted in a three-tiered ranking for stormwater BMP retrofit potential; the areas that received a low score in the composite analysis are included as the Low-a category for the pre-assessments. Both subwatersheds in the Upper Potomac Direct watershed have about the same amount of land area that conforms to Low-scoring residential ranking, and have no other assignment in the desktop analysis, at about 188 acres each. The Low-a category accounts for about 20% of the total candidate acres in the watershed.

b) Historically Zoned Areas

Historic zoned properties in the Upper Potomac Direct make up 20.5% of the total candidate acres in the watershed. Most of the land areas with historic properties in the County MS4 are located in the Little Monocacy subwatershed.

c) Mirant Power Plant

The Mirant Power Plant property makes up a significant 40.3% of the candidate acres in the Upper Potomac Direct. The Montgomery County DEP staff considers this area as having a very low priority for stormwater BMP retrofit, relative to other areas in the watershed.

3.2 COUNTY FOCUS AREAS

The desktop analysis for the Pre-Assessments, refined by the first-hand knowledge provide by DEP staff who understand the historic land-use changes, planned zoning changes, planned development, status of existing stormwater BMPs, socio-political priorities, and constraints, among other factors, resulted in restoration "focus areas". They do not include County schools which are being addressed through a separate process.

These Focus Areas (Figures 3-1 and 3-2) are considered the best candidates for restoration, other than upgrades to existing BMPs, and include a mix of parcel sizes, primarily within the medium-priority groups. Table 3-2 summarizes the size, amount of imperviousness and whether a focus area currently has any stormwater management BMPs in place.

There are a total of 250.3 acres of untreated acres in the Focus Areas, all in Broad Run. In total, 15.7% of the Focus Area acres in Broad Run are untreated impervious acres (Table 3-2), but the relative impervious cover treatment effectiveness would vary by Focus Area with a range of 14.3% - 24.2%.

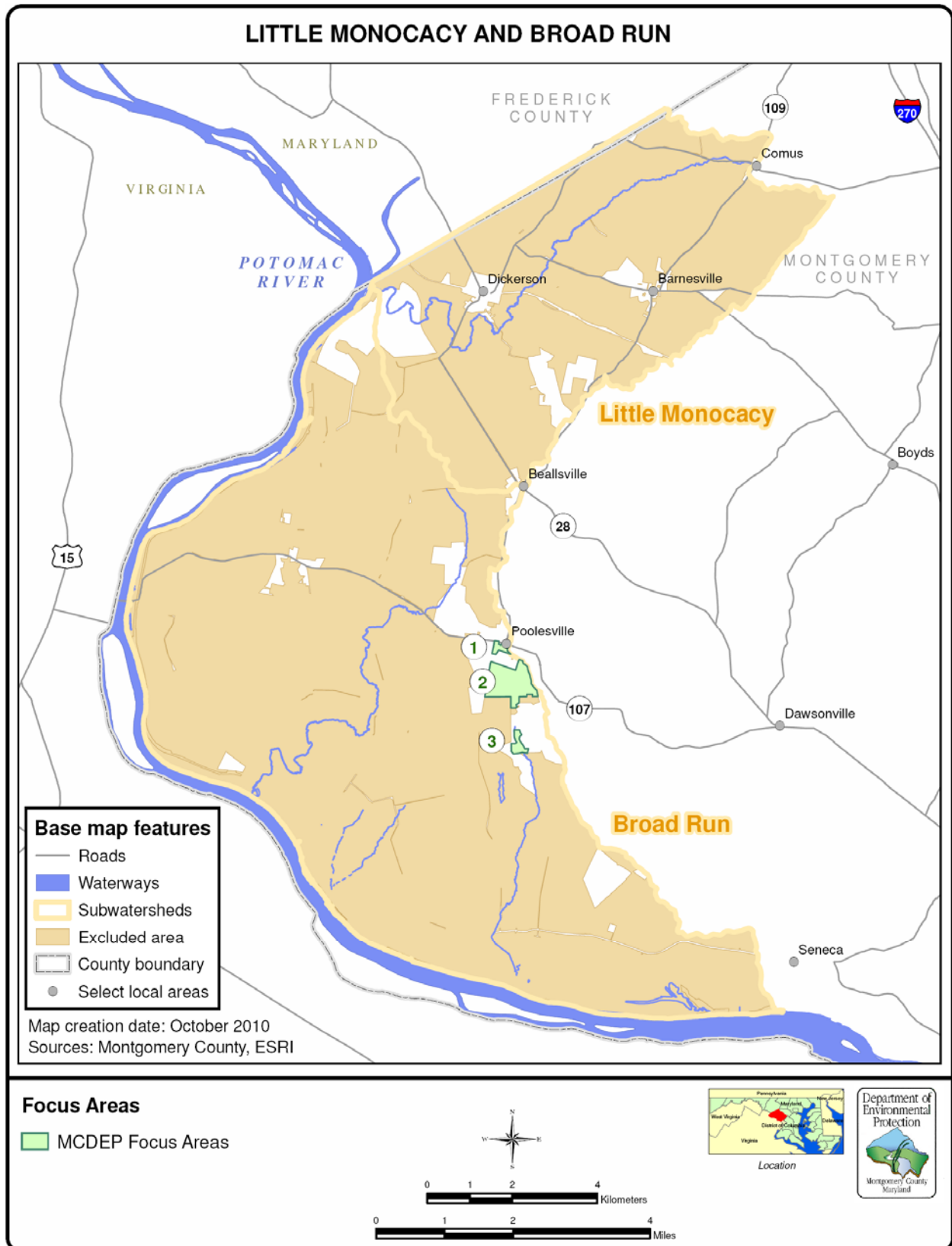


Figure 3-2. Focus Areas for restoration projects identified by Montgomery County DEP in Little Monocacy and Broad Run subwatersheds, Montgomery County, Maryland

Table 3-2. Untreated Acres, Untreated Impervious Area and Untreated Percent Impervious of Focus Areas of Little Monocacy^(a) and Broad Run Subwatersheds, Montgomery County MD.

Focus Area	Watershed	BMP Status^(b)	Untreated Land Area in Focus Area (Acres)	Untreated Impervious Area in Focus Area (Acres)	Untreated Percent Impervious in Focus Area
1	Broad Run	None ^(c)	28.9	7.0	24.2
2	Broad Run	None ^(c)	201.0	28.8	14.3
3	Broad Run	None ^(c)	20.5	3.5	17.1
		TOTAL	250.4	39.3	15.7
^(a) No Focus Areas exist within the Little Monocacy. ^(b) BMP status indicates that one or BMPs may exist in the particular focus area of the indicated BMP treatment era. Existing BMP drainage areas have been subtracted, hence specific indication of “untreated” acres in subsequent columns. ^(c) “None” indicates areas that do not currently have any stormwater management in place.					

3.3 EDUCATION AND OUTREACH FOR TRASH REDUCTION

There are no extensive data on specific trash and litter issues in the Little Monocacy and Broad Run subwatersheds. However, the entire Upper Potomac Direct is subject to conditions of the Trash Free Potomac Treaty. Since most of the developed lands are residential, it is likely that the trash reduction will occur through education and outreach. The Countywide Coordinated Implementation Strategy provides more specific guidance for using these non-structural approaches.

As is the case in other watersheds in Montgomery County, the focus for trash reduction will be through anti-littering education and outreach. In the course of developing the implementation plans, a series of practice sheets were developed to target key messages that use appropriate delivery methods for the population demographics in each watershed. It is anticipated that messages will be developed concerning dumpster management, littering enforcement, playing field trash disposal, and residential trash can maintenance.

In addition, practice sheets were developed that target reductions in private parking lot imperviousness, reduction in residential roof runoff, and riparian reforestation. All of these practices will be applied to the Upper Potomac Direct as appropriate in the implementation plan.

3.4 NEXT STEPS

As described above, this pre-assessment is the first step in developing the Upper Potomac Direct watershed assessment and implementation plan. The implementation plan will detail how the County will meet its MS4 permit obligations, which include addressing any waste load allocations (WLAs) for EPA-approved Total Maximum Daily Loads (TMDLs), as well as restoring an additional 20% of the total untreated impervious acres to the maximum extent practicable (MEP) on a Countywide basis during the five-year permit cycle, and providing trash and litter management as a condition of the Trash-Free Potomac Treaty.

Table 3-3 includes a summary of impervious area needing stormwater management within the watershed. The pre-assessment desktop analyses for Little Monocacy and Broad Run identified high-, medium- and low-priority areas for stormwater BMP retrofit. Based on the scope of this pre-assessment, we have identified 39.3 impervious acres within Focus Areas (see Table 3-2) and 2 acres of impervious acres within pre-1986 BMP drainage areas (see Table 2-3). This leaves 86.2 acres or about 68% of the 127.5 impervious acres in the Upper Potomac Direct for stormwater retrofit.

Table 3-3. Upper Potomac Direct (Little Monocacy and Broad Run) Impervious Area for County MS4	
Impervious Area	Acres
County MS4 total impervious cover	667.4 acres
Remainder untreated	637.4 acres
Focus Area projects impervious	39.3 acres
Pre-1986 Stormwater BMP retrofit treatment	2 acres

3.4.1 Steps to Complete the Watershed Assessment

As described in the Watershed Restoration Plan Framework, the watershed assessment for the Upper Potomac Direct will add to the pre-Assessment by updating any environmental condition information and conducting field investigations to identify specific watershed restoration sites. Following the field investigations, concept plans would be developed for candidate restoration sites as part of the action inventory. Pollutant loading estimates and public involvement would also be conducted to assign priorities and integrate the watershed assessment into the Countywide Coordinated Implementation Strategy.

Field Investigations: The ideal method for identifying restoration sites is to complete comprehensive stream and upland walks to ground truth the pre-assessment, watershed-wide. Recognizing budget constraints, we recommend that the field investigations be targeted to the high-priority areas identified by the desktop analysis for the pre-assessments, as well as the Focus Areas identified by DEP staff. The high-priority areas are existing BMPs that can be

retrofitted, while the Focus Areas comprise the best candidate areas of varying land use types based on institutional knowledge.

We recommend that the Upper Potomac Direct watershed assessment include the following field investigations:

- Stream Reconnaissance. Conduct stream corridor assessments (SCAs) or comparable investigations of the streams within the 250.4 untreated acres in the Focus Areas. The stream reconnaissance might address the entire untreated stream network or focus on the stream miles nearest to the 39.3 acres of untreated impervious surface to reduce the level of effort.
- Retrofit Investigations. Conduct retrofit reconnaissance investigations (RRIs) or comparable investigations at sites identified in the stream reconnaissance, as well as the three (3) BMPs permitted before 1986. We estimate that approximately 12 retrofit investigations may be needed to address the 39.3 acres of untreated impervious surface.
- Upland Investigations. Conduct hotspot investigations (HSIs), neighborhood source assessments (NSAs), and pervious area assessments (PAAs) or comparable investigations at sites identified in the stream reconnaissance. These investigations would identify source reductions and additional restoration practices beyond those identified in the retrofit investigations. Perhaps a dozen of each type of investigation would be necessary to identify specific practices to address the remaining acres of untreated impervious surface.

These field investigations may require approximately \$100,000 of effort.

Action Inventory. Following the field investigations, completion of the watershed assessment for the Upper Potomac Direct would involve completing the Action Inventory using the following steps:

- Concept Plans for Restoration Projects would follow the 2009 Maryland Stormwater Design Manual and address treatment of water quality and water quantity, providing stream channel protection as appropriate. We estimate that 12 concept plans would be developed for a level of effort of \$36,000.
- Community Education and Stakeholder Involvement would be an extension of the Public Outreach and Stewardship Work Plan developed as part of the Countywide Coordinated Implementation Strategy. This level of effort is estimated at \$50,000.
- Pollutant Loads and Anticipated Load Reductions would be determined using the simple WTM modeling approach defined in the Guidance Document. This level of effort is estimated at \$50,000.

- Priorities for Proposed Projects would be developed using a scoring and ranking system that reflects County priorities and is conducive to implementation planning.
- Preliminary Action Inventory As described above there should be sufficient projects within the existing BMP retrofits and focus areas to treat an additional 1879.8 acres of impervious area. TMDL or trash reduction targets will also be determined by the modeling to be conducted as part of the full watershed assessments.

The action inventory obtained from the watershed assessment would support the development of an implementation plan per the Guidance Document and meet the County obligations under the MS4 permit. The estimated level of effort developing the priorities and integrating public involvement into the effort to complete the action inventory is \$50,000.

The estimated level of effort for all aspects of the watershed assessment for the Upper Potomac Direct is \$300,000.

4. REFERENCES

Maryland Department of the Environment (MDE). 2009. Biological Impairments and TMDLs Montgomery County, Maryland. July 2009. Accessed from http://www.mde.maryland.gov/assets/document/hb1141/montgomery/mont_biological.pdf in October 2010.

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